UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS
FOREST ECONOMICS
RANGE RESEARCH

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BRANCH OF RESEARCH

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FOREWORD

HOW ABOUT IT?

Carl Hartley, Pathologist

A thing just occurs to me which is pretty thoroughly out of my line but which I am nevertheless passing on to you for what it might be worth. Has anyone ever considered the possibility of stimulating seed production in such recalcitrant things as red pine and western white pine by medication? The possibilities of producing unusual reactions in trees in the way of disease resistance, insect resistance, flowering, etc. by medication methods seem to me to be as limitless as the supply of organic and inorganic compounds which the chemist can produce. Some of the injection techniques do not appear to be so very expensive. I suppose that the possibility of inducing seed production by mechanical partial girdling and other cultural methods have been considered, but it occurs to me that the medication possibility may not have been brought up.

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The Editor

A few sentences from a letter received from a member of a Board of Review are interesting in the light that they throw upon the question of when a report is ready for submission to the Washington office. The writer of the letter is referring to a manuscript which was written for publication as a Department bulletin and "was submitted to Washington presumably for that purpose." He writes:

> "So far as interest and importance of its subject matter was concerned, there was no question that it was eminently suited for a bulletin. From the standpoint of writing and composition, however, as exemplified by faultiness and amateurishness in organization of material, duplication, repetition, intricacy of tables, verbosity in headlines and footnotes, and so on, it was most palpably unready for any sort of publication. It seems to me to be presuming altogether too much on the time and patience of the men of other stations, not to mention outsiders, to ask them to perform their proper function as reviewers, and yet to confront them with such distracting encumberances of poor composition. It has always seemed to me that it should be the responsibility of a Station Director to see that a report is in the best shape possible before it leaves his station, and not to pass the buck of literary drudgery to the board of review. It is farthest from my wish that what is said here should be a reflection upon the author of that report or upon the Director from whose station the report emanated. Although a finished writer himself, the Director no doubt feels that other duties of administration of the station more urgently required his time than that of training younger staff members in the rudiments of report writing. I feel, however, that it is unjust both to the reviewers and to the youthful authors to permit such crude literary efforts to leave the stations."

It is doubtless sometimes a question with the Station Director whether the strict standards for reports submitted for publication, as stated very clearly in memoranda from the Chief of the Branch, should not be interpreted with sympathetic leniency for the benefit of the younger men. The point is well made, however, by the writer above quoted, that such leniency is not for the benefit of either the younger worker or the station.

There would doubtless be no question that the duty of supervision of manuscripts sent in for publication should be assumed by the Director, whether or not other duties seem to conflict. Should the choice confront him, the Station Director would probably decide that, as a good administrative principle, he had better leave his own reports unwritten than allow poor work on the part of his assistants to leave the station.

Even if there were no specific instructions from the Chief of Branch on this score, it would seem to be good common sense for the station not to lean too heavily on the Chief of Office or the Board of Review or the Branch Editor in bringing reports by inexperienced writers up to the standard required for publication. In the first place there is no saving of time in so doing. Rewriting a report while the subject is fresh, while the material is at hand, and while advice or correction can be given in personal conferences is far easier and takes far less time than the revision of a manuscript of which the subject matter is already somewhat stale, and for which the data are filed away. The long-distance aids in the form of typewritten comment from the Board of Review and the Editor are furthermore less likely to be constructively helpful than direct, personal criticism.

It is the Editor's experience that a report which has not been painstakingly worked over at the station to begin with is rarely ready for publication after its first revision, but must go through the process of revision two or three times. Of course, the difficulty at the station may be not one for which the Director is entirely responsible. If the writer himself is unwilling to accept correction or to apply himself whole-heartedly to a revision of his report under the guidance of the Director's wider experience and possibly greater ability, he automatically shuts himself off from the benefit to him that is to be gained from submitting his report in acceptable shape.

The point raised by the writer of the letter quoted in the beginning of this article is not, of course, that of meticulous correctness of diction, but rather the avoidance of the results of ignorance or inexperience or slovenliness in the preparation of a report. The faults to which objection has been made are not those that would tax the ability of any Director to uncover and correct, and it would seem that for the prestige of the station and as a part of a station's administration they should be corrected before the manuscript is submitted.

Note: The Washington Office of Forest Experiment Stations would like similar comment from stations when in their judgment a report fails to measure up to the standard of what is expected from the stations. It is obviously impossible for us here to prevent poor manuscripts from going to a Board of Review, When such are received they should be sent back with comment to that effect, for we have no desire to permit the Board of Review system to become clogged through poor manuscripts.-ENM.

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FOREST EXPERIMENT STATIONS

Washington

General

A short visit to Columbus gave an opportunity of considering with the Central States Station the development of the oak growth and yield study. It now appears that this study will rank in its general importance along with the southern pine and the western white pine studies because of complexities in the problem, the number of species, and the difficulties inherent in tackling work with trees having a form other than that common to conifers. A complete series of volume tables will be necessary for some 20 species in addition to the six common oaks for which the yield studies will be based. Sites will be based upon the growth of oaks as an index. Much additional field work will be necessary to cover adequately the oak region and to get full and complete information for all species and sites. The oak study will be necessarily a cooperative project in which the three Stations, Allegheny, Appalachian and Central States, will be involved. It will, of course, also be necessary to call upon many other agencies, such as State Foresters, forest schools, and the eastern District, for additional data. At least another year's field work will be necessary.

Eyre returned to Washington after an extended trip to the Southern Station, where he visited the various field parties of the Station. He spent approximately a week's time with each of the various field units, obtaining in that way first-hand information upon the progress being made by the Station on its many lines of work.

Details

The three men from the experiment stations working on the oak study, namely, Buell, Schnur and Day, will probably complete their detail to Washington some time in March. At that time they will have completed the first stage of the volume tables for various species of oaks involved in the oak study.

Pearson came to Washington the first of the month to be with us for a period of two months or more to assist in reviewing manuscripts.

Kotok finished his assignment to Washington and returned to the California Station, leaving us to complete the tabulating work which yet remains to be done on the fire statistical study for California.

Division of Regions

In accordance with our desire to make an adequate division of the United States for forest experiment station purposes, it has been necessary to make some realignments in Station territories. For that reason Station boundaries were changed so as to include whole States, particularly in the Great Plains region. Outside of this belt the only change worthy of note is the shift of South Carolina, from the Southern Station to the Appalachian. This change was made primarily because of the closeness of the State to the Asheville headquarters and because of the large territory of the Southern Station which has rendered it impossible for the Southern Station adequately to serve the entire South.

Congress

The hearings on the McSweeney-McNary Bill, begun in February and extending into the first part of March, were very successful and a favorable report by both committees is expected. Approval of the measure was given by the President through the Bureau of the Budget. This approval will go a long way toward assisting in the passage of the measure, should it come up for consideration on the floor.

The Agricultural Appropriation Bill was considered in the House and reported out by the House Committee. It does not contain increases in the item for Silvical Investigations, the increases allowed by the Bureau of the Budget being eliminated in the Committee. There is a slight increase in the total SI money, however, due to an adjustment of funds between GE and SI covering the salaries being paid from GE which were many years ago paid from Research funds. Nothing has happened upon various experiment station bills which have been reported to the Committee.

New Personnel

Word has been received that Hugo L. Sundling, formerly of District 3 and now at the Pennsylvania State College, will work with the Allegheny Station as an Assistant Silviculturist during the summer, returning again upon his scholarship at the College. H. J. Lutz, who has been connected with the Connecticut Agricultural College, and working upon forestry soil problems in that State, has accepted a position with the Allegheny Station as Associate Silviculturist. W.C. Lowdermilk, who has been working for his doctorate degree at the University of California in forest soils, plans to become a member of the Forest Service this summer and has accepted an appointment as Silviculturist at the California Forest Experiment Station.

Dr. J. S. Boyce, Director of the Northeastern Station, assumes the duties of his position on March 1, when he leaves Portland for Amherst, stopping on the way to spend a few days at St. Paul, Madison, and Ann Arbor.

Forest Measurements

Most of the time in the Section of Forest Measurements has been spent upon the oak growth and yield study. The tabulating section has been for the most part engaged in the machine analysis of the forest fire statistics for California.

Library

During the month of February we loaned 977 books and periodicals, and 146 members of the Service and others consulted the library in person.

The number of books and articles indexed for the catalogue last month was 298.

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NORTHEASTERN FOREST EXPERIMENT STATION

During the fall of 1927 Westveld made some comparative tallies over a half-acre of semi-virgin spruce and hardwoods to determine, if possible, which method of tallying reproduction would give the most accurate results with the minimum of effort. The plan at first was merely to compare actual tallies. A statistical analysis, however, brought out several interesting and important points, although based on somewhat incomplete data. Three general methods of tallying were used:

Milacre Method. Samples one milacre in size were taken (a) over the whole area (100%); (b) on four strips evenly distributed over the area (17.86%).

Toumey Method, so-called. Twelve strips were laid out mechanically, each two feet wide, which were in turn divided into units 10 feet long (16.24%).

Frame Method. A square folding frame was used which enclosed an area of one metre. This method is commonly used in Scandanavia. Samples to the number of 306 were taken at regular intervals over the whole area (15.1% estimate).

Thus the various samples were, respectively, 43.56, 20, and 10.75 square feet in area. The points which stood out were:

1. The factor of accident is very high in fractional tallies because of the irregular and extremely high tallies occurring where rotting wood has created optimum germinating conditions.

2. After a considerable examination of statistical methods, the conclusion was reached that data which fall into a curve of such extreme skewness cannot be analyzed satisfactorily without a division to take off the tail of the curve so as to allow consideration of it separately. This amounts, in effect, to a splitting of the data in the field so as to consider all plots containing over any arbitrary number of seedlings as being in a separate class.

3. The Standard Error for the three methods was shown to be directly proportional to the size of the individual plot. Thus, for any given percentage of estimate, the order of desirability of methods was: Frame, Toumey, and last, milacre. Even distribution of samples over the area is superior to the tallying of a certain number of solid strips.

Stickel prepared a short article for the Monthly Weather Review on Forest Fire-Weather in Central Massachusetts. The 1927 fire records for some two million acres in the white pine region were compared with the weather data secured at Petersham. The results indicate that during the spring fire season hazardous conditions exist in the white pine type when the 2 p.m. relative humidity consistently falls below 40 per cent, or when the depression of the dew-point exceeds 14 degrees F. Between rainy periods the duff in clear cuttings under such atmospheric moisture conditions has approximately 10 per cent moisture in the surface layers and 20 per cent at one inch depth. During 1927 (April to July) 41 per cent of the days had humidities of 40 per cent or less. Over 90 per cent of the fires occurred on such days, accounting for 95 per cent of the area burned, damages, and suppression costs.

Spaulding finished a preliminary report on the effect of lopping on the decay of hardwood slash. Investigations will be continued in the future as suitable material can be found. It is hoped to follow up a number of side issues which will contribute toward a general investigation of decay of wood in various forms, which are also necessary to this specific problem. Work on the larch canker is being continued with the help of Mr. J. R. Hansbrough, who is assigned by the Bureau of Plant Industry to this problem. One lecture on the larch canker was given at New Haven at a meeting of tree surgeons and experts.

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CENTRAL STATES FOREST EXPERIMENT STATION

General

Munns and Bruce visited our Station for part of two days. Our hope to finish the yield study of oak this year, which was very promising up to that time, received a severe set-back.

Day is still on detail in Washington. McCarthy attended the meeting of the Southern Forestry Congress at Louisville and the American Forestry Association at St. Louis. He also spoke before the Lumberman's Club of Columbus at its regular bi-monthly luncheon.

McCarthy visited the Knox Forest in Kentucky. About a thousand acres of this are very suitable for planting tests of species. The Station regrets the decision announced later, to abandon this area, since it is the only National Forest area in the territory of the Station.

Meyer and McCarthy established a sample plot on land owned by the Mead Pulp and Paper Company southeast of Chillicothe, Ohio, during the last week of the month. An area of hardwood sprout growth previously cut will be burned over as a preparation for planting by the Company.

A curriculum suitable for the first two year of a course in forestry has been prepared and submitted to a number of forest schools. When accepted for full two years credit, there is now evidence that this curriculum will be recognized as a major group in the College of Agriculture of Ohio State University although no attempt will be made to give four years of forestry work.

Oak

The results of Haig's work on white pine indicate the possibility that stands with less than 75% of oak may show yields comparable to those already taken. This will be tested.

An attempt will also be made to relocate some of the older plots in Maryland for remeasurement. Conversion factors for cordwood will be obtained if a cutting can be located where second-growth oak trees are being cut into cordwood lengths.

The oak yield plots measured during the past several years lack, especially in the earlier ones, the diameter height curve now prescribed; Crown class heights were recorded instead.

During the latter part of the month, Bower worked on the sample tree height-diameter measurements to establish curves for plots of the several dominant height classes. For plots of the same dominant height class, age was found to influence the diameter-height relation to a very slight degree, so curves of diameter-height are being prepared for the height classes. Crown class does, however, influence the diameter-height relation sufficient to warrant the belief that diameter-height curves for each of the crown classes would not make a continuous curve if combined for the entire stand.

Hanley, Kellogg, and Bower finished the scarlet oak volume tables and started making summaries of the oak yield plots for the tabulating machine. The tables were constructed on volumes secured from tree graphs in which the points of measurement were connected by straight lines. On account of the basal area scale, which is one co-ordinate of the tree graphs, curved lines through points, if properly drawn, conform more closely to the form of the tree. A study is to be made to determine the necessary corrections to alter the volume tables and place them on a curved line basis.

It should be pointed out that the method of connecting plotted points by straight lines is in conformity with the computation of cubic volume by the formula $(B+b)/2$. Drawing curves introduces a possible compensating error due to the personal judgment and need not represent the actual form of the tree.

A sample of about fifty trees was selected at random, the points of the graphs were connected by curved lines, and the cubic and board foot contents were planimetered and scaled off. The percentage ratios between the curved line and straight line volumes were calculated by height classes, and plotted: per cent over height class. A practically straight line was easily fitted to the points. Two separate summaries, to see if the correction factors varied with d.b.h., class showed practically a negligible variation.

This study was made for each of four tables. In three of them, the tables were high, not to exceed 1.4%. Only in the Scribner board foot table were values raised, the maximum being 4.8%. The following tabulation gives the correction factors as applied to the respective tables:

Table of Correction factors to apply to Scarlet Oak Volume Tables.

Table	Remarks	Total Height Class - Feet							
		20	30	40	50	60	70	80	90
		Multiply table values by the factor.							
Total peeled cubic vol. table	Lower Table values	.986	.987	.988	.989	.990	.992	.993	.995
Merchantable cubic volume table, with bark	Lower Table values	.986	.988	.989	.992	.993	.944	.996	.977
International Board Foot Volume Table	Lower Table values	..	.990	.992	.994	.966	.998	.999	1.000
Scribner Board Foot Volume table	Raise Table values	..	..	..	1.048	1.040	1.032	1.024	1.015

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LAKE STATES FOREST EXPERIMENT STATION

Zon just returned from his winter trip through the region, in the course of which he talked to over 1500 people, including groups at the University of Michigan, Michigan State College, University of Chicago, and Iowa State College, besides a number of service clubs and special meetings. He now claims to have "sworn off talking for about five years," but the staff (and Washington too!E.N.M.) is a bit dubious. He participated as a member of the Executive Committee in arrangements for the Wisconsin Commercial Forestry Conference to be held in Milwaukee, March 28-29. Tentative arrangements were made with the Department of Conservation of Michigan for a cooperative project on release cutting in scrub oak in southern Michigan.

The Station welcomes Carlos G. Bates, who arrived in St. Paul on the 14th of the month to become a member of the Lake States staff. As soon as he arrived, the dirt literally began to fly. He potted in deep galvanized cans the soil samples collected last summer from the Minnesota National Forest and the Ruse sub-station, reconstructing the original profiles as far as feasible. These are to be used for greenhouse seedling experiments with some of the northern species.

Forest Fire Studies

One of the outstanding events of the month was the appearance of the bulletin, "Forest Fires in Minnesota," by J. A. Mitchell, the first major publication of the Lake States Station. Two thousand copies have been printed, through the cooperation of the State of Minnesota, and it is likely that more will be needed, as the office has already been overwhelmed with requests. The report analyzes in a comprehensive way the records of past fires in the State and points the way toward more effective protective measures. Although of chief interest to Minnesota and the Lake States region, the general facts brought out and, in particular the mode of study and the convincing way in which the data are presented and applied, make the bulletin well worthy of consideration by those concerned with forest protection in any region. Judging by requests for a large number of copies from forest schools, we suspect that it will become the textbook on fire protection in the region.

Mitchell is preparing a similar report for Michigan. All basic data have now been assembled on punch cards, which are ready for machine sorting and final tabulation. Taylor is assisting by plotting on maps the location of fires for the past three years, classified by cause, size, etc.

Cooperative Studies in Wisconsin

A cooperative arrangement was made with the State Department of Conservation and the University of Wisconsin for the conduct of forest research in that State. Under the agreement between $2000 and $2500 is made available for the initiation of forest studies between now and July 1, when further funds will be provided. Several projects are under consideration, such as: growth of hardwoods and hemlock after clear cutting and selective logging; possibilities and need of planting in Wisconsin; fire hazard as affected by forest cover and weather; development of windbreaks and their value upon farms; and methods of improving growth of black spruce, white cedar, and other species in swamps. This material cooperation is indicative of the recent awakened interest in forestry in Wisconsin, and will give a marked impetus to the efforts of the Station to solve the most pressing forest problems of the State.

Wisconsin Type Map

Kittredge and Taylor prepared a map showing the distribution of the present forest types in Wisconsin, similar to the one made for Minnesota last month. All available sources of information were consulted, and the knowledge of several people familiar with the State was drawn upon, but the map is at best tentative and far from accurate. Again the lack of specific information on type location was brought out, especially in trying to distinguish areas of aspen from the true northern hardwood type.

Swamp Drainage Project

In connection with the Station's general forest swamp study, Averell continued the collection of facts and data relating to swamps and their improvement, particularly the methods and possibilities of promoting forest growth by drainage. About 125 new titles were added to the extensive bibliography, and over 60 references were read and abstracted. An analysis of the records of the swamp on the Minnesota National Forest, which was experimentally ditched in 1926, shows that the water level has been lowered about a foot by moderate drainage. Vegetational responses and acceleration of tree growth will probably not be very marked for a few years.

Soils Notes

Averell has completed the preparation of a demonstration soil profile cut out from the typical sandy soil of the Minnesota National Forest Norway pine lands. It consists of a vertical section 4 feet deep, 1 foot wide, and about 4 inches thick, brought intact from its original position. The natural color is preserved by impregnating with glycerin, and the soil is protected from disturbance by a glass cover. The exhibit will be used in demonstrating the character and horizons of a typical, slightly podsolized forest profile.

As illustrative of the cooperation in soil analysis and classification, which the Station is receiving, may be mentioned the aid of Mr. J. O. Veatch of the Bureau of Soils in Michigan in identifying and describing the characteristics and properties of certain soils encountered in the scrub oak study in that State. Incidentally, Mr. Veatch has recently prepared a map and report showing Michigan soil types and forest cover which is one of the best attempts at correlation of these two conditions that has yet appeared in this country.

At a recent seminar of the Soils Division of the University of Minnesota, Kittredge gave a review of Hesselman's "Studies of the Humus Layers of Coniferous Forests, Their Peculiarities, and Their Dependence upon Silviculture."

Northern Hardwoods Plots

Mowat completed the compilation of records of the permanent sample plots established during the past field season in the northern hardwood type at the Upper Peninsula field station. Since these were only initial measurements in a long-time study of a virgin stand, a selectively-cut forest, and a clear-cut area, no conclusions can yet be stated. However, the records of the uncut stand present rather an interesting and complete statistical picture of the virgin hardwood forest. The abundance of advance reproduction here is astounding - over 30,000 stems per acre, of which 99 per cent are sugar maple. On the station tract cut clear 10 years ago, a great variation in the character of the stand in different spots is apparent, but in general the sugar maple reproduction is making poor progress, in spite of its great numbers, and in many places is dominated by aspen, fire cherry, ironwood, and other less valuable species, even where no fire has occurred.

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APPALACHIAN FOREST EXPERIMENT STATION

MacKinney completed reports on ten permanent sample plots established in 1927 and on remeasurements of seven plots established earlier. These plots are in the Bent Creek experimental forest, near Asheville, and in the Edinburg, Va., working centers, and belong to the studies of chestnut replacement, methods of cutting in hardwoods, and thinning in hardwoods.

Harold Morey, who has been with the Station under temporary appointment, returned to Iowa State College at the end of the month to continue his forestry courses. Scholz, Ziegler, and Nothstein completed the coding, punching, and verifying of the data collected in 1927 on the loblolly pine management study. The punch cards are ready to be put through the sorting and tabulating machine at Washington.

Frothingham spent most of the month on the Station's investigative report and plans for 1928. He gave short talks before the Monarch and American Business Clubs of Asheville, and attended the Tenth Southern Forestry Congress at Louisville. A day's trip to the Clarke County (Indiana) State Forest was made from Louisville, with Acting State Forester R. F. Wilcox as guide.

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SOUTHERN FOREST EXPERIMENT STATION

General

F. H. Eyre completed a month's detail in the South, during which time he gained a first hand knowledge of the various Station projects by assisting in the routine work at each of the four branch Stations, spending about a week at each place.

John A. Putnam joined the staff on February 23 to work as a temporary field assistant on the hardwood study under Lentz. The Station is fortunate in securing Putnam, who has had nearly three years of practical experience in the Southern hardwoods, in southern Arkansas and northwestern Florida. His knowledge of hardwoods has been obtained by actually operating a sawmill and marketing the product. Three years at the Michigan Forestry School has given him a fundamental training in forestry, and he expects to complete his forestry course at the first opportunity.

Demmon attended the meetings of the Southern Forestry Congress at Louisville, Kentucky, and the American Forestry Association at St. Louis. He spent the day between these meetings in visiting the plantations on the Indiana State Forest in Clark County, Indiana, in company with a number of foresters. Wyman, Harper, and Vining attended the Fifth Annual Get-Together meeting of naval stores men at Savannah, Georgia. Wyman also attended a meeting of the Board of Directors of the Florida Forestry Association, of which he is a member, and of the Florida State Board of Forestry, where he presented a short paper on "Improved Methods of Turpentining." He also gave a talk before the meeting of the turpentine operators at Jessup, Georgia and at the Savannah Exchange Club, explaining the work of the Southern Station.

Protection, Fire

At Urania, Barrett was able to complete the first five-year remeasurements of the loblolly fire plots, and a beginning was made on the office work of assembling the data. The longleaf fire plot at McNeill was burned over successfully during the month.

Management

Barrett completed the establishment reports of the cone production study at Urania and the Brown Paper Mill Company seed tree cutting near Monroe, Louisiana.

During his visit at Urania, von Maltzahn pointed out that the so-called "German thinning" there would no longer be considered as standard practice in Germany. Instead, the Germans believe in a much heavier thinning, cutting more heavily into larger crown classes. However, they are able to do this on account of having a market for all classes of trees removed.

The sowing tests on the different grass surfaces at McNeill were completed early in the month by Wahlenberg. On account of the cool weather, germination did not take place until near the end of the month. Upon examination at that time it was found that birds had eaten most of the seeds in the unprotected spots, while mice or other small rodents had been able to destroy many of the seeds even on the protected spots.

Naval Stores

Early in the month Wyman completed the laying out of the new experimental area in southern Mississippi for a gum production test with slash pine. Just previous to this he had lined up a similar test on longleaf on the Choctawhatchee Forest.

The new longleaf and slash pine plots near Starke have been laid out, the trees numbered, and most of the tree descriptions and measurements taken.

Cold weather, which has been severe in Florida this winter, broke a large number of cups and it was necessary to dip the gum from the cups which were not broken and to replace those which had been broken at Kingsley Lake.

Dr. Cary and Miss Gerry spent a part of the month at Starke and continued their cooperative work with the Station.

Forestation

Gemmer spent practically the entire month in laying out and planting the nursery located at Camp Pinchot, and also put in a number of seed spots. These seed spots are being made on brushy sites and on those from which brush competition has been eliminated.

Wakeley's work at Bogalusa included the start of the five-year reexamination of the loblolly spacing plantations. Despite rather heavy tip moth infestation, the plantations are doing well. Many of the trees, six years from seed, are eight or nine feet tall.

An attempt was made to kill Bermuda grass root stocks in portions of the Great Southern Lumber Company's nursery beds by treating with one half ounce or one ounce of 40 per cent formaldehyde per square foot. These tests constitute about half of our limited nursery work for this year.

Longleaf seed released from a 60-foot fire tower were found to fly 800 to 1000 feet distant in a stiff breeze.

Protection, others

Wahlenberg, with the help of student assistants Hills and Lloyd, completed the seedling counts and mapping on the longleaf grazing and fire experiment at McNeill. Here they found that carpet grass seems to have spread a little on the burned and grazed pasture during the last four years. It might even have advanced further had it not been for the set-back it received during the very severe drought of 1924. The annual control burn of the 160-acre pasture at McNeill was made during the month.

Wakeley observed adult pine tip moths flying early in February and a heavy flight late in the month, at which time a number of specimens were obtained. A moth emerged during the first half of February in a cage which had been placed around infested twigs last October.

J. A. Beal of the Bureau of Entomology spent a week at Starke in connection with an investigation of the life history of the turpentine beetle. New emergence holes were noticed but no beetles were found in flight. A number of emergence holes were marked on burned places at Kingsley Lake in order to note the appearance of new holes from time to time. This will enable us to determine dates during which the adult beetles are in flight.

Hardwoods

Lentz made a brief survey of six parishes in northeastern Louisiana, obtaining data on hardwood conditions and preparing ownership maps. A number of hardwood mills were visited, as well as some woods operations. After a brief office period, Lentz returned to the field, with Putnam, and the two will now study in detail some of the localities which offer the most promise for these investigations.

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CALIFORNIA FOREST EXPERIMENT STATION

General

The District Investigative Committee meets on March 12, and the usual work in preparation of this event is keeping the staff busy. Following this meeting the newly appointed Advisory Council will be brought together for the first time. The membership of the Council represents the more important interests of the State.

Management

Work was continued during the month on the Methods of Cutting study. The progress report for the Sequoia Plot 1 was completed by Siggins.

Riley, detailed from the Modoc, has been abstracting data useful for management plan preparation from the Methods of Cutting records. This material will be assembled into a handbook for administrative officers, entitled "Preparation of Management Plan."

Dunning has given considerable time to preparation of the annual investigative report and has completed a chapter on forest types for a school book on forestry, being assembled by the California Development Association.

At the request of the Sugar Pine Lumber Company's forester, Siggins made a trip to Northfork to inspect a proposed location for a cooperative nursery. The lumber company has set up a fund of $6,000 per year to be used for nursery and planting work. Their forester desires the Forest Service to cooperate by furnishing supervision of the nursery operations. The stock produced would be divided in proportion to the values contributed. The proposed site appears to be excellently adapted for nursery purposes and has an ample water supply already available. The company would pay for all physical equipment and common labor. If administrative considerations can be satisfied this will afford an excellent opportunity for demonstrating our experimental results on a commercial scale. The Station is involved only to the extent of giving occasional technical advice.

Southern California

Kraebel has been in the office during the entire month; Wieslander spent the greater part of the month on the Angeles Forest with

the cover type crews; Lowdermilk made one trip to the Barranca area to check up on the results of the storm of February 3-4; Weaver, at the Nursery, had a busy month dividing his time between the Barranca rainfall and erosion installations and the urgent work of distributing the surplus planting stock from the Nursery.

At Devil Canyon Nursery the chief activity of the month was the lifting and shipping of some 20,000 transplants, mostly Coulter pine, to our cooperators, including San Bernardine City and County, Riverside, San Diego, and Orange counties, the California Botanic Garden, and the Carnegie Institution Acclimatization Gardens (Dr. F.E. Clements) at Santa Barbara. Additional shipments are still to be made to Santa Barbara City and San Bernardino County. Sample plots will be staked on several of the larger plantations for observation by the Experiment Station.

Several thousand 2-0 plants of 22 species were received from the Eddy Tree Breeding Station. The larger part of this has been planted on the San Bernardino National Forest, and a small group of each species was outplanted in the vicinity of the Nursery. Other plantings at Devil Canyon consisted of windbreaks, arboretum groups, and several experimental series.

During the month one thousand pounds of Coulter pine cones were received at Berkeley from Los Angeles County and the seed is being extracted by our own men in the University extractor. Of the seed thus far extracted, about 20 per cent by volume is worthless because immature (10 per cent) or riddled by the larva of a lepidopterous insect (15 per cent). The worthless seeds are removed by flotation in water, a method which has proved 100 per cent dependable for Coulter pine seed. It is hoped to obtain enough good seed to yield 50,000 seedlings by the fall of 1928.

Other seed supplies on hand or already in seedbeds are estimated to yield seedlings as follows:

Conifers (25 species)	65,000
Hardwoods (6 species)	1,000
Eucalypts (16 species)	8,000

Forest Influences Study. The most intense rainstorm of the season occurred on February 3 to 5 and produced interesting results at both the reservoir and the superficial run-off plots. Total rainfall for the storm at the Nursery (elev. 2700') in Devil Canyon, 4.26 inches; on the Barranca Burn (elev. 1950 to 3100') one mile away and facing the San Bernardino plain, 3.34 inches; in San Bernardino City (elev. 1054') seven miles out from the mountain front, 2.62 inches.

Two previous storms this season produced small amounts of run-off of clear water from the burn, but this storm brought a considerable load of eroded material, built a good-sized delta at the inlet end of the reservoir, and laid down a half-inch blanket of fine silt over the rest of the basin floor. Water in the reservoir rose rapidly to a depth of five feet, ample proof that our construction has not been on too large a scale. Computations of quantities have not yet been completed, but two points of outstanding interest are indicated: namely, the correlation of intensity of rainfall with rate of run-off, and the sorting of sediments in the reservoir.

At the intensive run-off plots (elev. 2350') excellent records were obtained which will make possible complete correlation of the rainfall and run-off. As was to be expected, the differences between the denuded and cover plots, with respect to amounts of run-off and erosion, were enormdus. But the most interesting feature thus far developed by Lowdermilk's data is the striking difference in the composition and amount of the filtrates obtained from the relatively clear run-off waters even after the removal of the sediments.

The gratifying results of this first "effective" storm proved the wisdom of having established these plots in duplicate; i.e. two cover and two denuded, each plot having its own recorders. Although all of the instruments did not function perfectly during the entire storm, enough of them did work so that the essentail continuous records were obtained of rainfall, and of run-off from one bare plot and one cover plot. This experience appears to justify the observation that where the results of an experiment depend absolutely on the proper operation of intricate mechanisms, it is likely to be ultimately more wasteful of funds to trust to a single installation than to incur originally the expense of duplicate installations.

Cover Type Map. Under Wieslander's personal supervision the type map has progressed on the Angeles Forest with the same cooperative crew of six men which was organized in January. Working usually in pairs, the men have completed the easily accessible "front" country and have pushed into the rougher back country.

Entomology

Forest Insect Investigations. Person spent most of the past month in working up the data on the Modoc sample plots. Besides the relative susceptibility to insect attack of Dunning's different tree classes, size and shape of crown, total tree height and other characters are being studied in their relation to susceptibility.

The core measurements for Brown's Well plot have been completed and curves made which compare the mean growth rate of the trees killed by the western pine beetle with that of the living trees, by years from 1917 to 1927. It was found that the insect-killed trees had a growth rate less than half that of the living trees. The cores from the living trees showed much greater "sensitivity" than the cores from the insect-killed trees.

In connection with the seed extraction from Coulter pine cones being made by Kraebel, a considerable amount of insect work was noted both in the woody parts of the cones and in the seeds. A number of cones were cut up and examined and it was found that there were two distinct types of injury. The placid buprestid Chrysophana placida (Sec.) was found principally in the larval stage, in most of the cones, but in no case could the seed injury be ascribed to this borer, though its tunnels penetrated all of the woody parts of the cones. The injury to the seed itself was older work and, though no insects were found, it is believed that the injury was probably caused by a lepideptorous larva. Counts made on the extracted seed showed that this undetermined insect had destroyed approximately 15 per cent of the mature seed.

Products

Project No. 264 (White Fir). Combing over the large volume of data obtained in the field on the white fir project for the preparation of the final report has proved more interesting and enlightening than Brundage had anticipated. The material has been accumulated more or less intermittently in connection with trips to various parts of the State made primarily for other purposes. When one gathers data in such a manner over a long period without being able to find the time necessary for office analysis after each trip, the general impression on the mind of the one who has recorded the miscellaneous notes is apt to be one of hopelessness as far as a final solution of the problem is concerned, especially when that problem involves such a heterogeneous tangle of psychological and material factors as the white fir situation. The prejudice against the species which one encounters everywhere can almost invariably be traced first and foremost to improperly seasoned stock and secondly to improper use. Cheap Douglas fir coming into California in transit, both in cargoes and carloads has, of course, been a very potent influence in retarding local sales of white fir. It would be folly to deny that bargain prices on a competing species - prices which mean absolute loss to the producing mill - have played a leading part in undermining the market for our locally produced construction material which often costs more on the green chain than common grades of Douglas fir laid down in the retailer's yard. Nevertheless, price cutting does not account directly for prejudice.

Successful marketing of white fir in restricted regions proves that it can find its place on its own merits provided the producer makes a real and not a superficial effort to overcome the causes of prejudice. California's home markets should absorb every foot of white fir produced by California sawmills. This is not a large order, the annual production being only about 240,000 M feet. Bringing about such an ideal situation rests more on the shoulders of the producers than it does on the strengthening of Douglas fir prices. Greater care in sawing, improved methods of seasoning to reduce yard losses, and an ironclad rule never to ship anything but dry stock of #2 Common and Better - these three changes from the present loose practices appear from careful analysis of the data to constitute formula #1 for curing the present chronic affliction which makes white fir a "little used species" in one of the States where the species grows in abundance.

Wood Identification. Two controversies between buyer and seller over identification of foreign woods came to the Products office for settlement. One involved "Philippine mahogany" - was it red lauaan or tanguile? - and the other centered around Brazilian rosewood. Both are examples of the confusion caused by trade nomenclature. When a buyer orders rosewood is he supposed to get Dalbergia, Platymiscium, or what have you, in genus as well as in species? Page Solomon.

Lumber Census. As only three weeks have elapsed since the requests for census information were mailed to the lumber industry of the State, no figures are as yet available on the cut. The census for 1927 is unusually inclusive and when the returns are complete, should give a very good idea of the financial status of the lumber industry. The most interesting feature to date is the large number of split stuff operators reporting from the pine region. We have had very few returns from this source previously, so there has been no way of comparing the total value of pine region and redwood region split products.

Returns from small operators are much better than usual, owing to a new system of checking the few items which apply to these minor outfits in the long and formidable list of questions on the census form and directing the mill owner to "answer only those items checked," stamped on the face of the form. In former years, small mill proprietors have thrown up their hands and called for help when they received the stupendous four-page questionnaire calling for data which could only be filled in from the most elaborate of bookkeeping systems. They figured they must answer all or nothing, so we usually got nothing.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

February has been a month of meetings with us; preparation for, attendance at, and follow-up reports of these meetings have consumed a great part of the time of the Director and more or less of all the others. The Advisory Council held its annual meeting February 13 and this year the session was concentrated into a full halfday, followed by a dinner under the auspices of the Society of American Foresters at which C. A. Schenck spoke. This year the Council considered for the first time the program of the Office of Products and of the Office of Forest Pathology, the work of which was explained by Mr. Gibbons and Dr. Boyce, respectively. The Council discussed ways by which the fruits of research might better find a market and also ways of stimulating research by other agencies. It was recommended that the Station issue periodically mimeographed notes of interesting progress and this suggestion will be followed commencing very shortly.

The annual meeting of the Western Forestry and Conservation Association in Tacoma was attended by Munger and Meyer for three days. There was a good attendance from the forest protection agencies and lumbermen of the five western states. The discussions were very constructive and forward looking. There was also a note of optimism as to the prospects of actually getting the lands of the West on a timber-cropping basis. A novel feature of the program was several papers which made a prophetic forecast of what lumbering and forest protection would be like twenty-five years hence. In D. T. Mason's excellent paper on the problems before the experiment stations he mildly criticized the western stations for being dominated too much by the National Forest administrative organization with the result that the problems affecting the private owner are not given their due proportion of study. He also urged that the experiment stations do at least some work on a larger number of projects instead of concentrating and going so thoroughly into a few subjects; thereby certain problems which need at least a provisional answer would not have to wait perhaps several years until there were resources to make an exhaustive study. Mr. Munger had a short paper on his experiment station policy and program of study. Kotok and Weidman who were expected at this meeting were missed both on the program and in the informal conferences between times.

The last of the month was devoted to a two and one-half day session of the Investigative Committee whose number was increased to thirteen by the addition of Assistant District Foresters Ames, Brundage, and Kavanagh. Westveld and Munger represented the Experiment Station. The committee considered each of the 80-odd projects on the programs of the several offices and went into considerable detail in those which

provoked discussion. It decided this year to prepare a 20 or 25-page single-space digest of the report to circulate to forest officers and others. This plan was preferred to circulating either the entire report or a very brief summary as has been done in preceding years.

The decision is still hanging fire whether the State Forester will prepare a forest cover map and timber inventory of the State or not. A committee of the State Board is considering the matter and they have looked to the Experiment Station, as being the chief sponsor of the project, for a modus operandi. Munger has been in conference with this committee and spent considerable time making an estimate of the cost of the enterprise and the best ways of carrying it on.

When Dr. Schenck was in town he called at the station and the Director accompanied him over two of the larger paper plants in the vicinity. His talks at the City Club here and at the Society of American Foresters' meeting (as well as at various other places throughout the District) have started a lot of discussion and at least done good in starting people to think on the subject of forest economics. What the net result is on the layman is hard to say.

It is a truism that creative genius cannot be hurried but doesn't it take too long to route a report through all the experiment stations? For example a working plan that left here March 1, 1927, got back February 4, 1928, and this seems to be about average. Where comments are invited this is a pretty slow way to get them. The actual time in transit cannot be more than 15 or 20 days, which means that a report spends on the average nearly a month at each station. I bespeak a little more speedy circulation.

During the month spent entirely in the office, Isaac completed a long report on kite tests of seed dissemination, and short office reports on Douglas fir germination and survival in the virgin woods and seed storage in the duff. The seed dissemination report, complete or in digested form, will be circulated at a later date. The germination and survival in the virgin woods and the seed storage in the duff studies bring out the surprising information that after two winters of duff or soil storage under natural conditions Douglas fir seed shows no further germination either when left in place in the duff or when tested in the nursery germination bed. During 1928 another germination test will be made and in addition seed will be recovered from the duff for cutting tests and for the purpose of determining if its failure is due to decay or to abortive germination, or to just loss of viability.

In addition to the routine of computations in connection with the Douglas fir application study, Meyer started to think and plan seriously about the western yellow pine growth and yield study. The files of the Experiment Station and of the District Office contained some 80-odd references published or in manuscript form dealing with problems closely allied with western yellow pine mensuration. A satisfactory complete bibliography was not found and one is therefore now being drawn up, incorporating Dunning's and Weidman's lists, that it may be subjected to scrutiny and revision by all those interested. There is undoubtedly much material in manuscript form which is not available to the general reader but which should be made known to the investigators on such broad problems as western yellow pine presents.

On February 14 Munger and Simson spent a day watching the results of a series of experiments in snag falling sponsored by the Service and other forest protection agencies and cooperated in by the Du Pont Company. An electric drill was used to bore the snags and the holes were loaded with dynamite. Twenty (20), 40, 60, and 80 per cent powder was used. Attempts were also made to fell the trees by filling a hose with dynamite and tying it around the tree but without success. The electric-boring device was highly successful. An interesting point was the fact that snow was used as tamping on even the 40 per cent powder without apparent loss of blasting force.

Simson assembled the reports of the people who tried fusees last summer for backfiring. The concensus of opinion seemed to be that the fusee was a valuable addition to the list of firefighting tools, - not to supplant the Hauk torch but rather to supplement it where burning conditions were good.

Ranger Hulett has completed mapping the lightning storm reports and is now winding up the tabulation of data for punchcarding.

During the month the Wind River valley maintained its record of the unusual and spectacular by staging a winter forest fire. It was set by sparks from a donkey being used on the highway through an old Douglas fir burn. The sparks ignited nearby snags and soon the fire was roaring through them to the top of the hillside. There was a foot or two of snow on the ground but the relative humidity was reported as below 30 per cent.

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NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

The subject of experimental-demonstration forests received joint attention by the District Office and the Experiment Station during February. As a result of inter-office conferences and subsequent correspondence with several Forest Supervisors, three areas were selected for examination on the ground by members of the Office of Management and the Experiment Station. One of these is a western yellow pine area on the Bitterroot Forest, one a larch-fir area on the Flathead Forest, and the third a western white pine area on the Coeur d'Alene Forest. The Bitterroot area was examined by a field trip before the end of the month and the other two areas will be visited in the spring and early summer.

The western yellow pine area is located on Little Trapper Creek, about 75 miles south of Missoula, and was visited by a party consisting of Koch and White of Management, Weidman and Marshall of the Experiment Station, and Assistant Supervisor Adams and Ranger Wilkerson of the Bitterroot. The area comprises the entire drainage of Little Trapper Creek amounting to 2400 acres. It is accessibly located with its lower end but a half mile from the road up the West Fork of the Bitterroot River. The drainage contains what is considered a very good stand of virgin timber for this region, averaging 13,000 board feet an acre. Eighty per cent of the stand is western yellow pine and the remainder is chiefly Douglas fir. Typical of the timber in this territory it is almost entirely over 200 years old, although nearby along the road there are some 30 to 40 year old stands resulting from early cuttings. The latter are in some cases inside the National Forest boundary and will serve excellently for yield and thinning plots, though they are not favorably situated for inclusion in the proposed demonstration forest. The timber sales development of this portion of the Bitterroot Forest necessitates the extension of a logging railroad up the West Fork in the next few years and this will pass the lower edge of the area making its stumpage available for logging.

The merchantability of the virgin timber on this area and its amount totalling 30 million board feet, will permit a variety of cutting experiments by small sales for a number of years. The posession of a generous volume and acreage of merchantable timber in this way is more of a factor in selecting an experimental-demonstration forest than was formerly believed to be the case. It is only by having saleable saw-timber that cutting experiments can be financed. One of the limitations of the Priest River experimental forest in the western

white pine type is its deficiency of merchantable timber. In order to demonstrate methods of cutting there, it has been necessary to locate the permanent sample plots outside the demonstration forest on State and National Forest lands 5 to 25 miles away.

The Little Trapper Creek area seems to be eminently suitable for an experimental-demonstration forest in western yellow pine so far as accessibility, protection, virgin timber, and variety of sites are concerned. The area, moreover, seems to be representative of the yellow pine region of western Montana from the standpoint of soil, climate and general growing conditions. Trapper Creek Ranger Station and Seed Extraction Plant are only a half mile away and would furnish a site for living quarters. The practical absence of young age classes of western yellow pine is the chief failing of the area, but it is extremely doubtful whether a suitable yellow pine area with a diversity of age classes could be found anywhere in the region. It is the plan to recommend the Little Trapper Creek drainage for withdrawal as an experimental forest.

The proposed demonstration area for the larch-fir type on the Flathead Forest is located at Coram Ranger Station only about a mile from the Great Northern Railway and the automobile road to Glacier Park. The area is 7,000 acres in extent and embraces elevations from 3500 to 6370 feet. The forest varies from nearly pure larch to pure Douglas fir with a mixture of the two species predominating. There are also a few small bodies of lodgepole pine and Engleman Spruce. A portion of the area has been cut over for railroad ties, but most of it is in merchantable timber. This area will be examined by Koch and Weidman in the spring.

The status with regard to experimental-demonstration forests in the Northern Rocky Mountain region is as follows: The Priest River area of 4000 acres in western white pine and the Bernice area of about 3000 acres in lodgepolepine are already established. The western yellow pine and larch-fir areas described in this report have practically been selected for recommendation to the Forester for withdrawal. A proposed white pine area on the Coeur d'Alene Forest will be examined early in the summer. Still another white pine area is in prospect on the Clearwater Forest. It is planned to see the latter sometime during the field season. It is hoped that four new demonstration forests may be designated formally within a year from now.

The subject of natural areas for the preservation of virgin forest conditions has also received attention during the month. There are only three such areas already established in District 1, two containing old cedar stands on the Kaniksu Forest and the other contain-

ing an old mixed stand of white pine, cedar and hemlock and is located on the Priest River experimental area. These range from 128 to 470 acres in extent. Nine or ten additional natural areas of 160 acres or larger are being proposed, five of them to be located in existing and proposed demonstration forests. This program will cover all the forest types in the region including the Engelman spruce and subalpine type.

As a part of the new District study of adequate fire control by ranger districts, the lightning storm reports for the Superior district of the Lolo Forest were specially compiled to bring out additional information on this phase of the problem. As a result it was found that the period of warning of lightning storms approaching this district can be lengthened an average of two hours, and a maximum of at least 12 hours, by having certain Clearwater lookouts report to Superior headquarters as soon as they see storms. The adjacent lookouts outside the Superior district were rated in their efficiency in providing earlier warnings, and the lookouts inside the district were similarly classified. The increased efficiency, shown to be possible, can be obtained merely by making better use of existing telephone lines and personnel. Before starting this study there was hope that it might be possible to classify the storms as fire starters or non-fire starters before they passed over the Superior district, as well as providing a longer warning of their approach. But the records indicate that a storm which is a fire starter outside the district may be either safe or dangerous when it gets inside, and vice versa. The reasons for this variability have not been determined with assurance as yet, but several promising leads were developed which are worth further study.

A determination of seed survival according to period of storage in sealed bottles has been started by Marshall at the University of Montana laboratories. Seed of western yellow pine, western white pine, lodgepole pine, western larch, Douglas fir, Engelmann spruce, western red cedar, and western hemlock, which had been collected from 8 to 17 years ago and kept in sealed bottles at Priest River, are being germinated to determine the percentage of viability after that long period. Five hundred seeds of each of 25 samples have been sown in the sand flats.

During the last week of February Kempff gave a short series of lectures at the Forestry School of the University of Idaho. During the last few years the members of the staff have taken turns at giving a set of research lectures at this institution.

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ROCKY MOUNTAIN FOREST EXPERIMENT STATION

February Activities

Following the close of the District Investigative Committee meeting on January 31, Roeser spent the first two days of February in Denver revising the report in accordance with the action of the Committee and putting it in final shape for transmittal to the Forester. Bates, in the meantime, had journeyed to Fort Collins in the interest of the T-5 (Soil qualities in relation to growth) experiment, returning on the second to Colorado Springs. He left for his new assignment at the Lake States Station on the seventh.

Upon his return from Denver, Roeser assembled the T-1 (type study) records for the year 1927, and prepared such instructions, correction curves, etc., necessary for tabulating and compiling the data in the District office, if time is found during the summer which may be devoted to this cooperative effort. He then prepared a progress report on the "Effect of Thinnings in Sapling Douglas Fir in the Central Rocky Mountain Region," based upon the results of the latest remeasurement in 1927; also a companion report "The Occurrence of Pitch Girdle in Sapling Douglas Fir Stands on the Pike National Forest." The gist of these two papers was briefly outlined in last month's report, as was also that of Bates' last series of T-5 tests.

The District Investigative Committee having voted on the desirability of initiating the long-proposed brush disposal experiment at the Black Hills center during the coming field season, a working plan was prepared toward the end of the month, which will shortly be submitted for approval. The experiment very briefly is to determine the effect of different methods of brush disposal upon the latter inflammability of western yellow pine forests in the Black Hills region as affected by the presence of the brush and its rate of disintegration, and the more enduring effects upon growth, particularly by its action upon the soil through the retention or destruction of humus-forming material.

Current activity at the Fremont Field Station was confined largely to the thinning of the plot on the slope opposite the office, which is to serve as a typical and readily accessible public demonstration plot of desirable thinning and cutting practice. Owing to the continued openness of the winter, which is beginning to leave its mark on the ornamental lodgepole pines on the administrative area, it has been possible to continue cutting and skidding operations even on steep north slopes.

Some work was also done in providing additional horse pasture for the coming season and in building a new gate at the main Station entrance.

March Plans

Roeser will spend the first three days at the Fremont Station in order to give the laborer a lift in cutting trees on the above mentioned demonstration plot and to do some necessary work in the T-7 (Water requirement of coniferous seedlings) test. He plans to give most of his time during March to summarizing all data obtained since 1921 at the 14 Stations involved in the second phase of the type study which will be closed in 1929. What time there may be left will be used in compiling available growth figures in the jack pine thinning study on the Nebraska Forest, so that the data may be available to the Supervisor for determining desirable spacing in future plantations.

It may be stated at this time, for the benefit of other Experiment Stations and Forest Service offices, that the calibration service of Forest Service evaporimeters, which has been handled by this Station for the past several years, will be continued this spring, since no arrangement has been made to transfer this work elsewhere. Evaporimeters to be calibrated should be sent to Colorado Springs after April 1.

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Manuscripts

Central States

Forest Problems in the Hardwoods. E. F. McCarthy. (Read before Tenth Southern Forestry Congress, February 14, 1928.)

Pacific Northwest

Progress Report #1, Methods of slash disposal, western yellow pine, Deschutes National Forest, Plots Mb-1 and 2. R. H. Westveld.

Storage Tests of Noble Fir Seed. Leo A. Isaac. (Progress Rept.)

What are the most important problems for the experiment stations to study? A. T. T. Munger. Paper to be read at Western Forestry and Conservation Assn. meeting at Tacoma, February 22, 1928.

Appalachian

Southern White Cedar: Its Characteristics, Growth and Management. C. F. Korstian. (Technical Bul. of Dept.)

IN PRINT

Mitchell, J.A. Forest Fires in Minnesota. (Issued by Forest Service, State of Minnesota, in coop. with U. S. Dept. of Agr.)

Munger, Thornton T. 'At the Forest Cross-Roads.' The Commonwealth Review of the University of Oregon Vol. IX, no. 4, Oct. 1927.

Wakeley, P.C. On Writing up notes. Jour. of For., Jan. 1928.

Zon, Raphael. What is industrial forestry? Jour. of For., Jan. 1928.

Zon, Raphael. Improving Timber Growth in Northern Swamps. Forest Worker, vol. 4, no. 1, p. 11. January, 1928.

Zon, Raphael. Relation of Forests to Floods. Presented at hearing before Committee on Flood Control of House of Representatives, Jan. 21, 1928. Vol. 5.

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OFFICE OF FOREST PRODUCTS - District One

Sawmill Studies

The final installment of the article "Size and Defect - Important Factors in Lumbering" by M. Bradner and S. V. Fullaway, will appear in the March issue of The Timberman. This installment deals with the relation of amount of defect to the value and cost of the lumber produced. The data are presented mainly in tabular form, in which the log is taken as the basic unit of measure.

A rather interesting relation between defect and values and cost is brought out under the discussion. A comparison between the values per M feet of sound and defective logs of the same top diameter shows the following results. The value per M feet lumber tally of the product obtained from defective western yellow pine logs averages around $3.55 per M less than that of sound logs in the diameters between 6 and 29 inches. For diameters 30 inches and up the value per M feet lumber tally of the defective logs averages $4.10 above the sound log value. The high value of the very large-sized defective logs as compared with small logs is due to the per cent location and character of the defect which occurs. Defect in small logs of common grade generally results in changing No. 2 and No. 3 grades of common lumber into grades of No. 4 and No. 5. This will, of course, lower the value per M feet of the lumber in such logs a considerable amount, where No. 4 and No. 5 Common boards are saved and sold. In small logs from young trees the rot has not generally reached a very advanced stage within the log, and most of the defective material is considered merchantable. In large logs from old trees the rot has reached a more advanced stage and much of the wood material is entirely gone. Normal rots generally occupy the heartwood of the tree or log. The percentage of such rots increases as the size of the log increases. Such defects, therefore, eliminate much of the low grade (No. 3 and 4 Common) material in the log thereby increasing the log value. In Idaho white pine the value per M feet, on a lumber-tally basis, of defective logs will average considerably lower for all diameters than for sound logs of the same diameters. An abrupt rise in the value per M feet in the large logs is also noticeable.

Comparisons of value per M feet of sound and defective logs on a log-scale basis show entirely different results. In defective logs of both western white and western yellow pine the value per M feet log scale is considerably higher for almost every diameter class when compared with sound logs of the same size. This increase in value of the defective logs when placed on a log-scale basis is due to the high percentage of overrun obtained in logs of this type.

A defective log containing a normal amount of defect, 10 per cent in white pine and 5 per cent in western yellow pine, compared with a sound log of the same diameter will show practically the same value per M feet (log scale). In general, it may be said that a normal amount of defect will not increase the value per M feet over that obtained from sound logs or trees.

Census

The number of returns received to date indicates that somewhat better progress has been made on the 1927 canvass in the same length of time than in the last biennial census of lumber and timber products which was taken two years ago. In the present canvass approximately 40 per cent of the Idaho and Montana operators responded to the first request as compared with 34 per cent for the year 1925.

Mr. Whitney spent the greater part of the month in editing the returns and lining up the District tabulation work required before the first consignment of completed schedules can be forwarded to Washington.

D-1 Stumpage Prices

Tabulation of the data on stumpage values for 1927 is practically completed. Quite comprehensive reports for individual stumpage transactions have been received from the Supervisors, but very few of these returns cover the large transactions involving $10,000 or more. A number of very satisfactory returns covering transactions of this size have been received through the requests accompanying the Lumber and Timber Products census schedules.

It is felt that more representative stumpage prices for the region are secured by supplementing the request accompanying the census schedules with the results from an individual followup by the Supervisors.

Errors and inconsistencies in the smaller transactions are very common in the stumpage returns reported in connection with the lumber census. They are principally due to lack of understanding of the form and poor arithmetic. Confusion between log and stumpage prices is a common source of error. Since the Supervisors' reports cover principally the smaller transactions and are quite dependable, a good cross section of the values embraced in all sizes of transactions is obtained.

Following are the maximum and minimum stumpage prices obtained for the various species throughout the District:

PRICE PER M FT.

Species	Private		Forest Service	
	High	Low	High	Low
W. White Pine	11.50	.67	6.00	1.50
W. Yellow Pine	5.00	1.50	3.25	2.00
D. Fir	2.64	0	4.00	.50
L-D.F. Mixture	2.64	0	1.50	.50
Lodgepole Pine	4.25	0	4.00	1.00

All prices given for western white pine are for transactions in North Idaho. The $1.50 minimum for this species under the Forest Service column covers the sale of fire-damaged timber on the Harvey Creek chance, Kaniksu National Forest.

The maximum price of $2.64 per M for Douglas fir and larch-Douglas fir mixture covers a transaction in which timber was manufactured to sawed ties.

The maximum prices under the Forest Service column for Douglas fir and lodgepole pine, also for lodgepole pine under the Private column, cover transactions in the mining districts east of the Divide in Montana.

The minimum prices of 0 under the Private transactions represent those sales in which the mixed species were considered as having no value but carried along by the pines.

One of the largest stumpage holders in Western Montana reports an average price of $1.68 per M for 20,726 M feet of yellow pine and 52,947 M feet of larch and Douglas fir, or a total volume of 73,673 M feet.

Lumber Prices and Movement

	Annual, 1926	Annual, 1927	January, 1928
Idaho White Pine	$ 37.77	$ 35.86	$30.17
Pondosa Pine	26.33	25.17	24.19
D. Fir and Larch	17.78	18.19	16.38
White Fir	19.10	17.41	16.80
Spruce	23.73	23.39	25.67

Lumber Price Reports

During the month of February the following reports were completed by Mrs. Bullard: Fourth Quarter, 1927, Lumber Prices; Annual Lumber Price Report, 1927, and Retail Lumber Prices for the fourth quarter, 1927.

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OFFICE OF FOREST PRODUCTS - District Six

Advisory Council

Mr. Gibbons attended the annual meeting of the Advisory Council of the Pacific Northwest Forest Experiment Station, outlining current and proposed work of the Office of Forest Products and giving the status of each approved project. For some time, and largely as an additional measure for avoiding poorly-conceived forest products research, it has seemed that the field of the Council might well be broadened to include the research of the Office; not only is there a natural interrelationship of certain phases of timber growing and wood utilization, but the Council as now constituted has a good knowledge of the problems involved in both lumbering and forestry.

To the extent that no question was raised, it is assumed that the Council gave approval to the general policy of the Office, which is to acquire and assemble information that will serve not only in eliminating wood losses but also in bringing about a give-and-take between the practices of logging on the one hand and those of timber growing on the other.

The Council again manifested interest in the general survey of wood losses in the logging camps of the Douglas fir region; at last year's meeting this project was covered in considerable detail by Mr. Gibbons. Moreover, all the members seemingly considered the approved felling and bucking study in the Douglas fir region and the proposed general survey of wood losses in the sawmills of the Douglas fir region as very desirable.

The Council was especially interested in the mill utilization study in the western yellow pine region, so much so, in fact, that they, by resolution, recommended that this study not only be continued but enlarged to include the logging of that region. During the discussion it came out very clearly that the Council was favorably inclined to work that will indicate rather conclusively the cost and returns by utilizing trees of different sizes and quality. Before the Council passed this resolution, it was definitely brought out by Mr. Gibbons that the pushing of work in the pine region would hold up either the felling and bucking study in the Douglas fir region or the general survey of wood losses in the sawmills of the Douglas fir region; also that much could be said in favor of the Office concentrating its efforts in the Douglas fir region.

District Investigative Committee

As to new projects for the Office, the Committee which met February 28, 29 and March 1, made the same recommendations as the Advisory Council, or:

(1) That utilization studies be conducted in the Pine Region, including both manufacturing and logging, primarily from the standpoint of eliminating wood waste and bringing about a more satisfactory integration of lumbering and forest management.

(2) That a general survey of wood losses be made in the sawmills of the Douglas fir region.

General Wood-waste Survey in the Douglas Fir Region

Mr. Hodgson spent the entire month computing and tabulating the results of the field work in preparation for the final report. As a part of the survey very complete data relating to snags found on the logged-off areas were taken. These data, in part, are summarized in the following tabulation:

Snags Found Upon 150 Sample Acres on the Logged-Off Lands of 24 Companies in the Douglas Fir Region, After Logging but Before Slash Burning.

Number and Gross Volume of Snags Reduced to an Average Acre

District	No. of camps	No. of plots	More than 12 ft. high			Less than 12 ft.	Total	Volume of standing snags over 12 feet high (Feet board measure)		
			Standing	Cut down	Total	Standing	No. of snags	Standing	Cut down	Total
Puget Sound	9	54	3.3	2.9	6.2	2.1	8.3	4,191	9,126	13,317
Grays Harbor	3	27	1.5	4.6	6.2	0.9	7.0	1,075	22,480	23,555
Willapa Harbor	2	12	3.2	3.8	7.0	2.2	9.2	3,001	15,300	18,301
Columbia River	4	25	1.9	3.0	4.8	2.4	7.2	2,778	8,790	11,567
Willamette River	3	16	0.3	4.6	4.9	2.3	7.2	225	6,928	7,154
Coos Bay	3	16	1.5	1.0	2.5	3.0	5.5	1,004	1,135	2,140
Total	24	150								
Average			1.9	3.3	5.2	2.2	7.4	2,046	10,626[1]	12,672

[1] This figure is probably high because only the stumps of the felled snags were available for measurement. From these the D.B.H. was computed from taper curves and volume tables applied as for living trees. No doubt a few felled snags were broken at the top but a large majority unquestionably stood in unbroken form.

Kiln-Drying Douglas Fir Common

Mr. Johnson's report "Degrade in Kiln-drying of Douglas Fir Common and Finish," based on the degrade study conducted at the plant of the Oregon-American Lumber Company, Vernonia, Oregon, was published in the February issue of The Timberman. This office will receive 400 reprints of the report for distribution. The Oregon-American Lumber Company, moreover, it is understood, has requested several hundred reprints from The Timberman.

Mill-Utilization Study

During the month, Mr. Johnson completed the computation of the cut and over-run on the 2,600 logs sawed in the yellow pine mill-scale study at the plant of the Mt. Emily Lumber Company, LaGrande, Oregon. The data are now ready for compilation by log classes and diameters, and the like.

Census

The taking of the 1927 lumber, lath, shingle, log, cooperage and veneer census was continued during the month. Of the 2,016 companies solicited, 1010 companies have submitted returns. Three hundred edited schedules were forwarded to the Forester during the month.

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REPORT OF THE FOREST TAXATION INQUIRY

With the exception of Forest Economist Murphy at Washington and two clerks who are still on duty at Madison, Wisconsin, all of the permanent staff of the Forest Taxation Inquiry are now assembled in New Haven. Since this marks the opening of a new chapter in the history of this organization, a brief recounting of the progress thus far made is in order.

It will be recalled that "The Select Committee on Reforestation," appointed in 1923, made a nation-wide survey of the forestry situation, with hearings covering all the important forest regions. At these hearings the importance of state and local taxation as an obstacle to forestry was stressed by many witnesses. The Committee included in its recommendations a proposal for a comprehensive federal investigation of forest taxation. As a result of the recommendations, the Clarke-McNary Act was passed, including provision for such an investigation. Pursuant to the terms of this act, the Forest Service established the Forest Taxation Inquiry and imposed upon it the duty of conducting the study of forest taxation. New Haven was selected as the general headquarters with space in Marsh Hall (formerly the building of the Forest School) obtained through the generosity of Yale University.

Field Work in Minnesota

Active field work began in July, 1926. Prior to that time activities had been confined to building up the staff, organizing the office, and making preliminary plans. While it was originally the idea to make a New England state the first field of investigation so that the technique could be developed close to headquarters, other reasons made it seem desirable to use the Lake States, and particularly Minnesota, for this purpose. Accordingly, it became necessary to keep the greater part of the staff in Minnesota for nearly a year, trying out various plans of study and collecting different kinds of data.

A forest tax amendment to the Constitution of Minnesota was voted on and passed in November, 1926, and the Inquiry was consulted with reference to legislation which was enacted pursuant to this amendment. Of course the Inquiry could take no responsibility for the general lines of this legislation which were foreshadowed in the terms of the amendment itself, but was able to give assistance in framing a law to carry out the policy thus determined. Later the Legislature provided for an Interim Committee to study the forest situation in Minnesota, giving especial attention to the taxation phase, and the data collected by the Inquiry have been made available for the use of this Committee.

The Minnesota study was primarily in the northeastern portion of the State, typical of the Lake States forest region. In addition, one woodlot county in the southeastern part of the State was studied. Besides the general county data secured, an intensive study was made of nineteen political towns, representing all conditions typical of this section. In these towns a detailed study of the physical, economic, and social structure was made, varying the emphasis and method as was deemed advisable after preliminary field studies.

The data generally secured in these towns included the forest cover, its type, size, density and value, the soil, rock, and topography, the assessed value of each unit of land with the improvements thereon, its ownership, tax burden, and delinquency history. For each town a detailed study of the schools, roads, and other functions of government were made. Data were gathered also to serve as the basis for an appraisal by the Inquiry of the value of each unit of land and improvements.

Wisconsin

While the Minnesota field work was under way, it was found that the College of Agriculture, of the University of Wisconsin, was engaged in a study of land taxation and utilization in Lincoln County and of county and school finance throughout the State, which, in respect to the kind of data collected, was similar in many ways to the Inquiry's Minnesota study. This was being conducted by Mr. W. A. Hartman and Mr. B. W. Allin under the direction of Professor B. H. Hibbard, the forestry data consisting chiefly of a detailed cover map being contributed by the Forest Service through Mr. W. N. Sparhawk, made in the summer of 1926 in connection with his Wisconsin project. An arrangement was made early in 1927 by which the Inquiry united forces with the College, both in working up the data for Lincoln County and in further field investigations, which involved the examination of eight additional political towns representing various forest and economic conditions typical of the northern part of the State and of one town in the woodlot region. An elastic arrangement permitted the College to pursue at the same time other lines not of pressing interest to the Inquiry and the Inquiry to conduct some work which it judged of importance but in which the College did not care to participate.

Michigan

Turning to the third Lake State, Michigan, plans were made and carried out by which the Inquiry has profited by the valuable data which have been collected by the State Department of Conservation through its

Land Economic Survey. The availability of this material made unnecessary much detailed field work, although a certain amount of supplementary information had to be collected. Material assistance is also being obtained by cooperation with Mr. K. Dressel and Mr. Wayne Newton, of the Michigan State College, who are respectively carrying on studies of the Pearson Timberland Tax Law and the school problem in relation to taxation. The Forestry Department of the University of Michigan, under direction of Dean Samuel A. Dana, is aiding in the study of tax delinquency in the cut-over counties.

Personnel

During all this time the technical staff of the Inquiry has been gradually built up. In order to give a more complete picture of the organization and its activities, the following roster of the members and the principal lines of work handled by each is presented.

Fred Rogers Fairchild, Professor of Political Economy in Yale University. Director Fairchild has had responsibility from the beginning for the work of the Inquiry, including selection of personnel, establishment of policies, development of plans, and preparation of material for publication, besides other details. He has represented the Inquiry at numerous conferences and hearings.

R. Clifford Hall, Senior Forester, formerly Valuation Engineer in the Timber Section, Income Tax Unit, of the Bureau of Internal Revenue. During the first field season, Mr. Hall was associated with the Director and Professor Chapman in helping develop the field technique, giving special attention to the examination and appraisal of property in the sample areas selected. He later directed the compilation of data from the files of the Timber Section in Washington. In 1927, upon the return of Professor Chapman to his teaching duties, Mr. Hall took the supervision of the organization. Since July he has given much time to the Wisconsin projects. He has also given assistance in planning forest taxation studies by State agencies in West Virginia and North Carolina.

Herman H. Chapman, Harriman Professor of Forestry in Yale University, Senior Forester. Professor Chapman took charge, under the Director, of supervising the Minnesota work. He has prepared reports on various phases of the Minnesota study and is giving such time as can be spared from his teaching to the compilation of these reports. He has represented the Inquiry at numerous meetings and hearings in Minnesota. An arrangement has been made by which the Inquiry will still be able to obtain his services for short periods in the future.

Louis S. Murphy, Forest Economist, whose previous work for the Service on forest taxation is well known. Mr. Murphy assisted in the Minnesota study during its developmental stage. Since then he has been engaged in making an analytical digest of existing legislation of the various states dealing with forest taxation, together with basic constitutional provisions, and in perfecting a bibliography of forest taxation. It is expected that he will soon have ready a complete and up-to-date abstract of all the forest taxation laws of the different states in form available for distribution.

Paul A. Herbert, Associate Forester, formerly Assistant Professor of Forestry in Michigan State College. Mr. Herbert was associated with Mr. Hall in the examination of sample areas in Minnesota, conducted a study of school finance, and assisted Professor Chapman in working up some of the Minnesota projects. He was the representative of the Inquiry in the early stage of the cooperative work in Wisconsin and in hearings relating to the new forest crop law adopted by that State. He later took complete charge of the investigation in Michigan, and is now directing the compilation of the data collected there.

Conrad H. Hammar, Associate Economist; formerly of the Department of Agricultural Economics of the University of Minnesota. Mr. Hammar joined the staff in the summer of 1927 and took charge of the field examination in Wisconsin. He assisted in working up some of the results of this examination and has since begun a general study of road finance in relation to forest taxation.

Daniel Pingree, Junior Forester; formerly stationed on the White Mountain Forest. Pingree joined the organization in the summer of 1927 and was associated with Hammar in the field examination of Wisconsin areas and in working up some of the data. He has since begun a general study of school finance in relation to forest taxation.

Martha Scott Epps, Assistant Economist; formerly of the Department of Agricultural Economics of the University of Minnesota. Miss Epps joined the organization late in 1927 and has taken over the statistical work formerly handled by Miss Jennie Goddard. She has charge of directing the computing, tabulation, and Hollerith work, except that being conducted in Madison by Mrs. F. C. McGindley in cooperation with the College of Agriculture.

Publications

It has been decided to issue an informal bulletin or progress report to make public from time to time such facts or conclusions of the studies conducted by the Inquiry as may appear to have immediate value to some considerable number of persons.

Such information, thus issued in advance of a formal report, is to be regarded as more or less informal in character. Some of it will be of only local interest, relating to problems of immediate concern only to the people of a certain state or region. Some may possibly be of merely temporary importance. Matter may be issued in only tentative form subject to further checking and correction. The bulletin will have no regular date of publication and no stereotyped form of content. It will nevertheless maintain a strictly scientific attitude, presenting only facts and such conclusions as clearly arise out of the facts presented. It will contain nothing by way of argument or recommendation. All such will be postponed to the formal report or reports which will not be issued until investigations have been carried on in a sufficiently representative group of states to warrant a degree of finality in the conclusions reached.

The first issues of the bulletin will appear soon.

Plans for the Immediate Future

The experience of the Inquiry in the Lake States testing various methods of investigation will facilitate the work elsewhere. It is expected that hereafter key states will be selected in the different forest regions and that much less time will be required to complete an adequate investigation in a given region. The work will be so organized as to bring all office work to the New Haven headquarters except such as is done elsewhere by cooperators or such specific projects as can be more conveniently handled at Washington.

The immediate plans of the Inquiry contemplate the early conclusion of the work of compiling data obtained in the Lake States study, preliminary work in preparation for gathering the field data in the two or three states next to be studied, and possibly the beginning of field work in New England. In June a part of the staff will undertake the field investigation of the Pacific Northwest region, within which Oregon has been selected as the key state. Special investigations of school and road finance in relation to forest taxation will be continued. A study of state legislation affecting tax delinquent real estate is contemplated. It is expected to organize the force so that detailed studies may be conducted in two forest regions at the same time, and the plan is to make a start elsewhere within a few months after the work in the Pacific Northwest is started.

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RANGE RESEARCH
Washington

Messrs. Nelson and Culley spent the month continuing the compilation and analysis of their Southwestern range material.

Range Research Well Supported at Forest Research Bill Hearings

Congressman Don B. Colton of Utah, Mr. J. M. Macfarlane, President of the Utah Cattle and Horse Growers Association, Col. Edward N. Wentworth of Armour's Livestock Bureau, and Mr. John T. Caine, III, now of the International Livestock Exposition of Chicago, but with headquarters in Logan, Utah and also a stockman of Utah, appeared at the hearings in support of Section 7 of the bill. Mr. Macfarlane made a very impressive statement before the Senate Committee and also before the Bureau of the Budget. Mr. Macfarlane and Mr. Caine went with the group to the White House to see the President and urge his approval. The hearings in the Senate were so short that Mr. Macfarlane was the only one called upon to testify in support of Section 7. At the House hearings, Congressman Colton made a very fine statement in general support of the bill, but spoke particularly for the need for range research, both on the public domain and private lands as well as on the National Forests. Col. Wentworth spoke specifically of Section 7, brought out the fact that very little of this character of research is now being done; that this would not duplicate the efforts of other Bureaus and other states, and spoke of the urgency of it in satisfactory range livestock production. The House hearings were cut short one day and it was necessary for Mr. Macfarlane and Mr. Caine to submit written statements just as a number of others had to do.

Congressman Colton Emphasizes Range Research

Congressman Don B. Colton of Utah gave a speech on the need for control of the public domain on the floor of the House, February 28. In this he referred very specifically to the benefits which have resulted from our range research, using examples from practically all parts of the West. Considerable interest was shown in this. The speech was published in the Congressional Record of February 29.

Public Domain Regulation Before House Committee on Public Lands

Congressman Colton took advantage of Mr. Macfarlane's and Mr. Caine's presence in Washington to have them testify before the Public Lands Committee of the House in support of his bills for regulation of

the public domain. Both Mr. Macfarlane and Mr. Caine referred specifically to the value of Forest Service regulation and to research results which show the advantages that can be obtained from regulation. The sentiment of the Committee appeared to be that they would not object to federal regulation of the public domain in Utah, but that they would have to study the situation throughout the other states.

There was a good attendance of the Committee and doubtless the testimony will have a wholesome effect in bringing clearly to the attention of the Committee the feelings of two progressive stockmen, supported by practically unanimous approval of the stockmen of Utah and by other endorsements throughout the West, of the principle of federal regulation as exemplified by the results obtained on the National Forests. Several of the Committee members appeared to be surprised to hear stockmen speak so favorably of Forest Service administration.

Soil Erosion, a National Menace in Government Printing Office

Mr. Chapline's manuscript, "Soil erosion on western grazing lands," which is part 2 of Department Circular 33, "Soil erosion, a national menace," completed its rounds of the Bureaus in February and was sent to the Government Printing Office. The page proof has just been returned. Dr. A. F. Woods, Director of Scientific Work, is very anxious to obtain early publication of this manuscript.

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FORAGE INVESTIGATIONS

Plant Routine During February

284 specimens, representing 7 collections, were sent to the Bureau of Plant Industry during February for identification; 268 specimens, representing 7 collections, were reported on to the field and, in addition, report was made on 284 (out of a total of 421) plants thus far determined in the "11th Wyoming Collection." 180 photostatic prints of economic-notes cards were submitted to the field. Approximately 100 specimens were filed in the herbarium, and 302 specimens were mounted.

Interesting Specimens of the Month

Ranger Vernon L. Collins' no. 148, Washington office serial no. 55029, Agrostis interrupta L. (Apera interrupta (L.) Beauv.), from the Nezperce National Forest, is a new record for the Forest Service, for District 1, and for Idaho. This is an Old World grass, until rather recently unknown from this country.

Cotype of Agoseris apiculata

Through the courtesy of Supervisor Borden and the District Forester at Denver the cotype of Agoseris apiculata Greene, the only specimen of the species known to be in existence, has been transferred from the herbarium of the Holy Cross National Forest and deposited in the U. S. National Herbarium. Its receipt, with thanks, has been formally acknowledged by Assistant Secretary Wetmore of the Smithsonian Institution and by Dr. Maxon, Associate Curator of the Museum, who is in active charge of the Herbarium. This specimen is Mr. R. T. Sobey's no. 5055, Washington office serial no. 2404.

Publications

Two brief papers, by Dayton, have appeared during the month (both in the January, 1928, number of the Bulletin of the Torrey Botanical Club), viz.: "Callisteris violacea Greene" and "A new Gilia from the Montezuma National Forest." These papers, both illustrated, clear up the hitherto uncertain status of two plants on our Montezuma Forest plant lists.

"Science," for March 2, 1928, has (p. 24) a brief account of a proposed series of publications by the Smithsonian Institution (in 12 de luxe volumes) to contain popularized and profusely illustrated accounts of the work of that Institution. One volume is to be devoted to Botany, and Dayton has been asked to cooperate with Dr. Coville of the Bureau of Plant Industry in writing a chapter in that volume on the western flora.

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DISTRICT 6

Mr. Ingram's time since last report was spent mainly on rearrangement of the herbarium, in filing some 800 identified, mounted and numbered plants and in compilation of the Columbia plant successional data in the project "Grazing Management of Cut-over Lands."

Segregation of this data on the 97 (chain x 6.6') plots on the Mr. Camp 9 transect used in this project, into grazed and protected, and grouped into 7 areas corresponding to the different logging and slash burn history which occurred thereon as a means of isolating and if possible eliminating other than grazing factors, proved quite a formidable task. This job was somewhat lengthened by frequent, albeit welcome, interruptions for review and analysis of project reports from the field and other current work including occasional visits with the herbarium.

This three year's successional record on the Columbia project (a fuller account of which will later be given) indicates an average decline of 24.4 per cent in the density of all vegetation on protected, and 39.9 per cent on grazed plots. The average grazing use based on complete utilization of all vegetation during this period was 54.13 per cent.

The greater decline on grazed than on protected plots may be taken as a measure of the influence of grazing on this transitory type to date. 24.4 per cent in the successive decline influenced by the climatic variation (2 dry years). This remarkable decline in density on both grazed and protected areas was occasioned in large measure by heavy decline in the 2 most abundant species found, fireweed declining 61.9 per cent on protected and 74.7 per cent on grazed plots, bracken 39 per cent on protected and only 9.5 per cent on grazed plots.

The grass and sedge group on the other hand increased 48.7 per cent on protected and 15.6 per cent on grazed plots. Other species of lesser moment made varying gains or losses.

The loss in density in the 7 area groups is extremely variable, ranging on protected plots from 30 per cent increase on area D to 46.3 per cent decline on area A. This variation expresses in large measure the influence of the previous logging and fire history on the 7 areas studied.

In determining the final influences, for good or bad, of different degrees of grazing use on succession its effect (a) on reduction in fire hazard, (b) on lengthening or shortening the grazing cycle and (c) on coniferous regeneration must be considered. Quite a different approach to the question of correct utilization is required on Douglas fir cut-over areas than in yellow pine. There is no question of maintenance of a climax grazing type in the Douglas fir cut-over areas, the climax successional type in this case is a stand of Douglas fir. Further successional study of this transitory type for several years is necessary before final conclusion can be obtained.

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JORNADA RANGE RESERVE

Range Conditions and Precipitation

A total of 0.8 inches of rain fell during the month. Considerable snow fell in the mountains. The ground is quite moist, and spring weeds should start up soon if the precipitation continues.

Condition of Stock

The good condition of stock is shown by the fact that the remaining calves were sold during the month at $35 per head.

Investigative Work

The computation of the 1927 quadrat sheets is nearing completion, and preparations are being made for the coming field season.

The Jornada Pasture Records, Quadrat sheets, and other material were forwarded to the Washington Office, where they are to be used by Chapline and Nelson in the preparation of Natural Revegetation and Carrying Capacity Manuscripts.

Mesquite Sandhill Succession

Campbell submitted his paper on Mesquite Sandhill succession for approval of the Washington Office. When approved the article will probably be submitted to the Botanical Gazette for publication.

After presenting the climatic and edaphic conditions of the Experiment Station, the paper shows the stages of succession through which the Mesquite Sandhill range must pass in order to reach a semi-desert grassland climax.

The first two stages may occur during the first year of favorable moisture conditions. Certain prostrate plants start up in the open spaces between mesquite dunes and aid greatly in reducing sand erosion. Then large, coarse weeds develop and continue the good work of stabilization.

The third stage develops best during the second year of ample precipitation. During the life of this association (*Gutierrezia* species), wind erosion is brought to a minimum, and the levelling of mesquite dunes is started.

The final stage is that of the grass association, starting with a Sporobolus community and ending in a grama grass climax. It is believed that during periods of favorable moisture conditions, conservative stocking of the range will permit the development of the succession just described.

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SANTA RITA RANGE RESERVE

Precipitation and Growth

February has so far furnished more than its share of moisture with approximately three-quarters of an inch falling on the 6th followed by 1.07 inches on the 10th. On the 15th and 16th rain and snow combined added 1.26 inches of precipitation with the latter averaging close to 8 inches on the level the morning of the 16th. This should assure a very satisfactory condition for early spring grwoth as soon as temperatures become favorable. Speaking of rain we are in receipt of information that whippets are very much adverse to going outdoors in the rain. For further information write the Coronado, attention Mr. McKenzie.

Condition of Stock

Cattle continue in good condition with excellent prospects for fat cattle this spring, providing the weather man sees fit to continue the liberal supply of moisture that has characterized the past month.

During the month the work of maintaining the protected plots over the entire reserve was finally completed and we are set for another year of wear and tear. It had been hoped that this year might mark the beginning of the use of iron posts on all maintenance and construction work, but the high cost of living makes it necessary to defer it and hope for the best another year. Iron posts would undoubtedly mean a very considerable saving in the course of a long period of years, since our mesquite posts ordinarily require replacement every 3 to 6 years and the iron posts bid fair to last 20 years or more.

Miscellaneous

The Mineral and Metals Corporation of Arizona has recently started operations on the "Graveyard Mine" which is located on the reserve just about a mile east of Huerfano Butte. A small smelter has been put in at Sahuarita and arrangements made to handle several hundred tons of ore from the graveyard mine within the next few months.

On February 6, the entire power plant, store and Post Office of the Ivy Dale Owen Cotton Co. at Continental was completely destroyed by fire of unknown origin. The power plant was only installed about 2 years ago and represents an investment of approximately $90,000 in engines and dynamos.

During the month Parker started a well at his home ranch and on last advices was down about 80 feet. Although he encountered some water he planned to continue to as great a depth as possible in order to provide an ample supply for all needs. The addition of a water supply at this place will mean a decided improvement in the management of Pasture 1, as well as adjacent forest range.

Advices from Culley indicate that some progress is being made in the rounding out of data for a publication covering the results of investigative work at the reserve.

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